In the Specification:

Please **add** a new heading at **page 1, above line 1**, as follows:

TITLE OF THE INVENTION

Please **replace** the Title at **page 1, lines 1 and 2** with a replacement Title amended as follows:

[[~~A sensor~~**]]** Sensor transponder and **[[**~~a~~**]]** procedure for measuring **[[**~~tyre~~**]]** tire contact lengths and wheel load

Please **add** a new heading at **page 1, above line 3**, as follows:

FIELD OF THE INVENTION

Please **replace** the paragraph at **page 1, lines 3 to 4**, with a replacement paragraph amended as follows:

The present invention relates to a sensor transponder and a procedure for measuring **[[**~~tyre~~**]]** tire contact lengths and wheel load.

Please **add** a new heading at **page 1, above line 5**, as follows:

BACKGROUND INFORMATION

Please **replace** the paragraph at **page 1, lines 5 to 7**, with a replacement paragraph amended as follows:

A sensor transponder which is arranged in the vehicle **[[**~~tyre~~**]]** tire is already known from the German patent DE 44 02 136 C2, which comprises an acceleration sensor and a temperature sensor.

Please **add** a new heading at **page 1, above line 9**, as follows:

SUMMARY OF THE INVENTION

Please **replace** the paragraph at **page 1, lines 9 to 13**, with a replacement paragraph amended as follows:

The object of the invention is the simple and cost-effective calculation of the **[[~~tyre~~]]** tire contact area, since as the "effective" contact area between the **[[~~tyre~~]]** tire and the road, this significantly influences both the traction ~~behaviour~~ behavior (the force transmission ~~behaviour~~ behavior, braking ~~behaviour~~ behavior) as well as the friction loss resulting from flexing. The object is furthermore to produce a suitable device for this purpose.

Please **replace** the paragraph at **page 1, lines 14 to 16**, with a replacement paragraph amended as follows:

This object is attained by means of a sensor transponder with the features, ~~described in patent claim 1~~ and a related procedure with the features, ~~described in patent claim 8~~. as disclosed herein. The invention provides a sensor transponder with at least one acceleration sensor and a facility for transmitting measurement data from a tire to a receiving facility, characterized in that the sensor transponder is fitted on an inner side of the running surface of the tire. The invention further provides a procedure for calculating a tire contact length, whereby a sensor transponder is fitted with at least one

acceleration sensor arranged on the inner side of a running surface of a tire, the signals from the acceleration sensor are compared with threshold values and are then integrated, and the tire contact length is calculated independently of the velocity using quotient formation.

Please **delete** the paragraph at **page 1, lines 17 to 18.**

Please **add** a new heading at **page 1, above line 19**, as follows:

BRIEF DESCRIPTION OF THE DRAWINGS

Please **replace** the paragraph at **page 1, lines 23 to 25,** with a replacement paragraph amended as follows:

Figure 1 shows a schematic view of an arrangement of a sensor transponder according to the invention with an acceleration sensor in one **[[~~tyre,~~]]** tire,

Please **replace** the paragraph at **page 1, lines 26 to 28,** with a replacement paragraph amended as follows:

Figure 2 shows a diagram in which the ~~progress~~ progression of the centrifugal acceleration is shown with respect to the angle of revolution or rotation of the **[[~~tyre,~~]]** tire,

Please **replace** the paragraph at **page 1, lines 29 to 31,** with a replacement paragraph amended as follows:

Figure 3 shows five further diagrams for evaluating the signals from the sensor transponder for an acceleration sensor with low-pass ~~behaviour~~ behavior according to a first embodiment of the invention, and

Please **replace** the paragraph at **page 1, lines 32 to 35,** with a replacement paragraph amended as follows:

Figure 4 shows five diagrams for evaluating the signals from the sensor transponder for an acceleration sensor with differentiating ~~behaviour~~ behavior according to a second embodiment of the present invention.

Please **add** a new heading at **page 1, above line 36**, as follows:

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS OF THE INVENTION

Please **replace** the paragraph at **page 1, line 36 to page 2, line 7,** with a replacement paragraph amended as follows:

According to Fig. 1, a transponder or sensor transponder 1 for measuring a **[[**~~tyre~~**]]** tire contact length 6 is attached in accordance with the invention on the inner side of a **[[**~~tyre~~**]]** tire running surface 2. Using the transponder 1, data for one or more transmission and receiving ~~antennae (not shown)~~ antennas 21 of a receiving unit 29 which are

arranged on the vehicle for example can be transmitted in a wireless manner. This data can then be transmitted, for example, to a superordinate central unit ~~(not shown)~~ 22 as a digital value, or also as a signal (phase, frequency, amplitude or load modulation) which is modulated **[[**~~up to~~**]]** onto a HF carrier. Advantageously, but not necessarily, using a comparator 27 and an integrator 28, a comparison and integration can be made in the central unit 22 in particular between the individual data or signals and for example a correction of the **[[**~~tyre~~**]]** tire type, the temperature, the **[[**~~tyre~~**]]** tire pressure etc. and this can be forwarded to a superordinate system.

Please **replace** the paragraph at **page 2, lines 8 to 13,** with a replacement paragraph amended as follows:

The transponder 1 comprises at least one acceleration sensor ~~(not shown).~~ 23. The acceleration can be measured according to a capacitive (micromechanical, spring-mass areas), **[[**~~a~~**]]** piezoresistive (micromechanical, DMS seismic mass), ferroelectric (magnetic **[[**~~flow~~**]]** flux change), inductive (spring-magnet induction), electrodynamic (spring-electro**[[ ]]**magnet) or piezoelectric principle (material: in particular quartz, piezo ceramic or piezo foil; procedure: in particular bending, axial, torsion or shear strain).

Please **replace** the paragraph at **page 2, lines 14 to 18,** with a replacement paragraph amended as follows:

With measuring principles which additionally have a generatory effect, such as the piezoelectric principle, the acceleration energy can also supply energy to the transponder 1 and **[[**~~load~~**]]** charge an electric buffer ~~memory.~~ storage. In particular when sufficient energy is produced, the measurement signals can be transmitted to the receiving antenna or the central unit.

Please **replace** the paragraph at **page 2, lines 25 to 27,** with a replacement paragraph amended as follows:

According to Fig. 1, a countersink or deflection 4 of the **[[**~~tyre~~**]]** tire 2 is determined by the wheel load, the **[[**~~tyre~~**]]** tire type (dimensions, design, material etc.) and the internal pressure in the **[[**~~inner tyre~~**]]** tire. This countersink 4 results in a specific **[[**~~tyre~~**]]** tire contact length 6 on a road 5.

Please **replace** the paragraph at **page 2, line 35 to page 3, line 2,** with a replacement paragraph amended as follows:

This means that the centrifugal acceleration a with a constant radius r (were the transponder to be arranged on the wheel rim 3) and a constant velocity v is also constant (acceleration ~~progress~~ progression 8). In the area of the **[[**~~tyre~~**]]** tire contact length 6, due to the fact that it is mounted onto the inner side of the **[[**~~tyre~~**]]** tire running surface 2, no centrifugal acceleration 7 affects the sensor

transponder 1, since here, the radius r ~~runs counter to the infinite direction.~~ tends to infinity. When the sensor transponder 1 enters the area of the [[~~tyre~~]] tire contact length 6, the radius r initially decreases, leading here to acceleration peaks. The same principle applies when the sensor transponder 1 exits the area of the [[~~tyre~~]] tire contact length 6.

Please **replace** the paragraph at **page 3, lines 3 to 9,** with a replacement paragraph amended as follows:

For measuring purposes, the [[~~tyre~~]] tire contact length or tread footprint length 6 can be calculated according to the invention by evaluating the centrifugal acceleration 7 of the sensor transponder 1 shown in Fig. 2. Here, initially at least one acceleration sensor is used to record the time or angle-dependent progress of the acceleration a, which is converted into a corresponding ~~progression of stress.~~ voltage progression. Using a threshold and gradient evaluation explained in relation to Figs. 3 and 4, the [[~~tyre~~]] tire contact length 6 which is relative to the full revolution and independent of the velocity can be calculated.

Please **replace** the paragraph at **page 3, lines 10 to 13,** with a replacement paragraph amended as follows:

Knowledge of the [[~~tyre~~]] tire type can also be used to calculate to an adequate degree of accuracy the [[~~tyre~~]] tire contact area (tread). A further important variable,

the wheel load, can then be calculated with the aid of the pressure in the inner [[~~tyre~~]] tire, the temperature and the [[~~tyre~~]] tire contact area.

Please **replace** the paragraph at **page 3, lines 14 to 23,** with a replacement paragraph amended as follows:

By comparing these individual results [[~~(tyre~~]] (tire contact length 6, wheel load, [[~~tyre~~]] tire contact area) for all [[~~tyres~~]] of the tires, i.e. all wheels, a conclusion can be advantageously reached regarding the [[~~tyre~~]] tire pressures that are incorrect relative to each other and/or ~~which are~~ absolutely. ~~incorrect.~~ Furthermore, the wheel load and the [[~~tyre~~]] tire contact length 6 can be tested against prespecified limit values, and any excess of these values can be stored and, if necessary, displayed. In the further embodiment of the present invention, this information can for example be made available for a drive ~~phase~~ train electronic system for ~~optimising~~ optimizing the ~~engine-gear~~ engine-transmission setting, or for a chassis electronic system for setting the damper-spring characteristics, and/or an electronic brake for adapting the brake coefficients.

Please **replace** the paragraph at **page 3, lines 24 to 27,** with a replacement paragraph amended as follows:

The absolute (time-related) or relative (angle-related) [[~~tyre~~]] tire contact length 6 can for example be transmitted for this purpose to the superordinate central

unit as a digital value, or as a signal (phase, frequency, amplitude or load modulation) which has been modulated [[~~up to~~]] onto the HF carrier.

Please **replace** the paragraph at **page 3, lines 28 to 33,** with a replacement paragraph amended as follows:

The evaluation can be conducted, for example, in the manners described below with reference to Figs. 3 and 4. According to Fig. 3, with a DC-compatible (DC = direct current) acceleration sensor with low-pass ~~behaviour~~ behavior, the centrifugal acceleration 10 is ~~recorded~~ detected with an acceleration sensor (output signal 11) and ~~digitalised~~ digitalized with the aid of a comparator threshold 12. Not shown in Fig. 3 are for example ~~overlaid~~ superimposed vertical accelerations which may arise as a result of the quality of the road 5 (Fig. 1).

Please **replace** the paragraph at **page 3, lines 34 to 43,** with a replacement paragraph amended as follows:

The output signal 13 of the comparator controls an integrator 14 which can be ~~realised~~ realized in ~~analogue (OP-AMP~~ analog (op-amp and/or RC elements) or digital (counter) technology, and the ~~end tread-controlled~~ tread-length-controlled end value of which (marked by the bold arrows 16) is stored until the end of the period. With the respective positive flank ~~in each case~~ of the comparator output, a further integrator 15 is started, stopped and stored. Its output signal (marked by bold

arrows 16) represents a value for the duration of revolution of the [[~~tyre~~]] tire 9. The quotient formation of the signals 14 and 15 or this ~~stress~~ voltage ratio produce the relative [[~~tyre~~]] tire contact length 6 which is related to the [[~~tyre~~]] tire circumference, and which is thus independent of the velocity v or the rotational speed. Instead of the integrator 15, the rotational speed of the wheel can also be used in the calculation.

Please **replace** the paragraph at **page 4, lines 1 to 7,** with a replacement paragraph amended as follows:

The signal evaluation of an alternative, non DC-compatible acceleration sensor with differentiating ~~behaviour~~ behavior is represented in Fig. 4, whereby identical or similar components or signal ~~procedures~~ progressions are assigned the same reference numerals as in Fig. 3. Here, the output signal 11 of the acceleration sensor is compared against threshold values and evaluated in a ~~comparative~~ comparable or similar manner. ~~manner against threshold values.~~ In particular, the quotient or ratio formation of the signals 14 and 15 is achieved, as a result of which the [[~~tyre~~]] tire contact length 6 can be calculated independently of the velocity v.

Please **replace** the paragraph at **page 4, lines 8 to 17,** with a replacement paragraph amended as follows:

These two procedures according to the invention directly calculate the [[~~tyre~~]] tire contact length 6, but knowledge

of the [[~~tyre~~]] tire type can ~~also~~ further be used to calculate to an adequate degree of accuracy the [[~~tyre~~]] tire contact area (tread). A further important variable, the wheel load, can be calculated with the aid of the internal pressure in the [[~~inner tyre~~]] tire, the temperature and the [[~~tyre~~]] tire contact area. With the aid of the sensor transponder 1 according to the invention, and in particular its particular arrangement, the relevant data can be obtained. Therefore according to the invention, in an advantageous manner, the [[~~tyre~~]] tire contact area and the wheel load can be calculated from the [[~~tyre~~]] tire contact length 6 via its relationship to or dependence on the pressure in the inner [[~~tyre~~]] tire, the rotational speed of the wheel and/or the type of [[~~tyre~~]] tire used.

Please **replace** the paragraph at **page 4, lines 18 to 20,** with a replacement paragraph amended as follows:

In a preferred, full construction stage, the sensor transponder 1 preferably also comprises, alongside at least one acceleration sensor 23, sensors for temperature 24 and pressure 25, and a memory 26 for [[~~tyre~~]] tire-specific parameters.

Please **replace** the paragraph at **page 4, lines 21 to 30,** with a replacement paragraph amended as follows:

The essential features and advantageous further embodiments of the sensor transponder 1 according to the invention will

again be described below. The transponder 1 is mounted according to the invention on the inner side of the running surface 2 of the [[~~tyre~~]] tire 9. It comprises at least one acceleration sensor 23 for the measurement of the [[~~tyre~~]] tire contact length 6 described above. In addition, a memory 26 for the [[~~tyre~~]] tire-specific parameters for calculating the [[~~tyre~~]] tire contact area can be integrated on the sensor transponder 1. Furthermore, the transponder 1 comprises as an option a pressure sensor 25 for monitoring the [[~~tyre~~]] tire pressure and calculating the wheel load. In addition, a temperature sensor 24 for measuring the temperature and correcting the measurement values can be fitted on the sensor transponder.

Please **replace** the paragraph at **page 5, lines 2 to 17,** with a replacement paragraph amended as follows:

1 Sensor transponder

2 [[~~Tyre~~]] Tire running surface

3 Wheel rim

4 Countersink

5 Road

6 [[~~Tyre~~]] Tire contact length

7 Centrifugal acceleration

8 Centrifugal acceleration

9 [[~~Tyres~~]] Tire

10 Centrifugal acceleration

11 Output signal, acceleration sensor

12 Comparator threshold

13 Output signal, comparator

14 Integrator

15 Integrator

16 End value or output signal (bold arrows)

21 Receiving antenna

22 Central unit

23 Acceleration sensor

24 Temperature sensor

25 Pressure sensor

26 Memory

27 Comparator

28 Integrator

29 Receiving unit

[RESPONSE CONTINUES ON NEXT PAGE]